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Author(s): Lopez-Barlow, Jacquelyn Candelaria

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Heat Sources for Space Applications

Radioisotope Power Systems Program

Jacquelyn Lopez-Barlow
Program Manager

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Radioisotope Missions

Ulysses
(1990)

1981

Apollo 11 (1969)
Apollo/ALSEP (5) (1969-1972)



Moon

1991

Transit 4A
(1961)

2001
Transit 4B
(1961)

Transit
5BN-1
(1963)

Transit
5BN-2
(1963)

Nimbus III
(1969)

Triad-01-1X
(1972)

LES 9
(1976)

LES 8
(1976)

Mars



Viking 1 & 2 (1975)
Mars Pathfinder (1996)
MER Rovers A & B (2003)
MSL Curiosity (2011)

Jupiter

Saturn

Cassini
(1997)

Neptune

Uranus

Pluto
New Horizons
(2006)

Voyager 2
(1977)

Voyager 1
(1977)

Pioneer 11
(1973)

Pioneer 10
(1972)

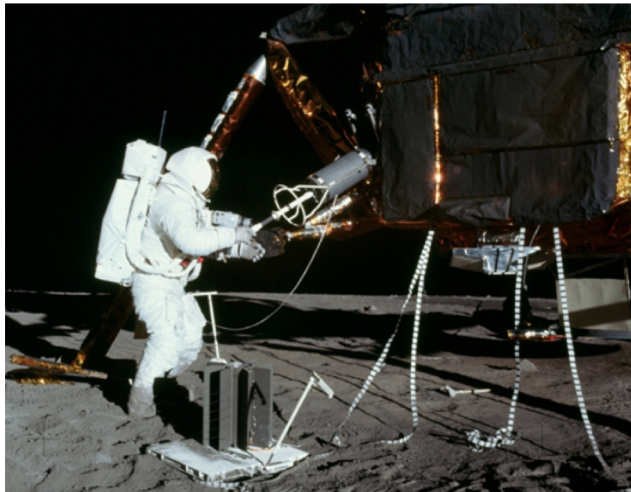
Galileo
(1989)

2011

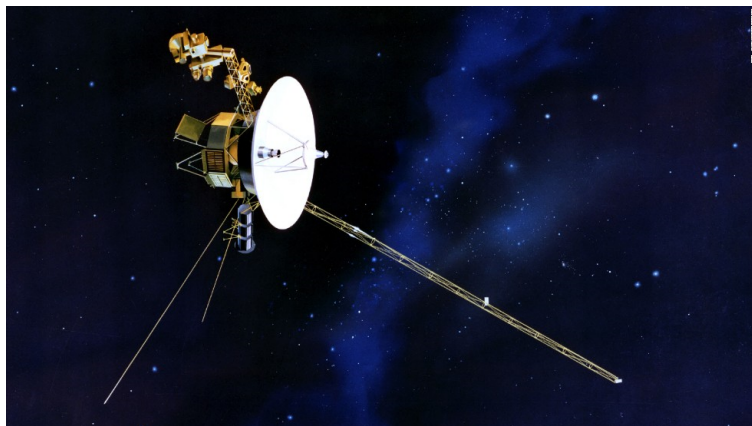
Distances & Planets Are Not To Scale

Mound to LANL

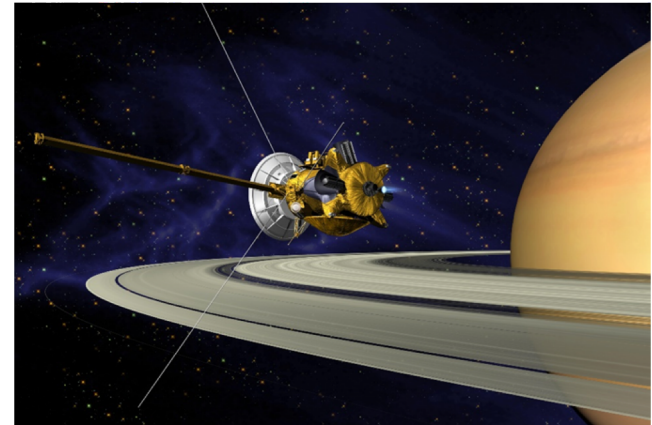
1970's Al Bean SNAP-27/Moon



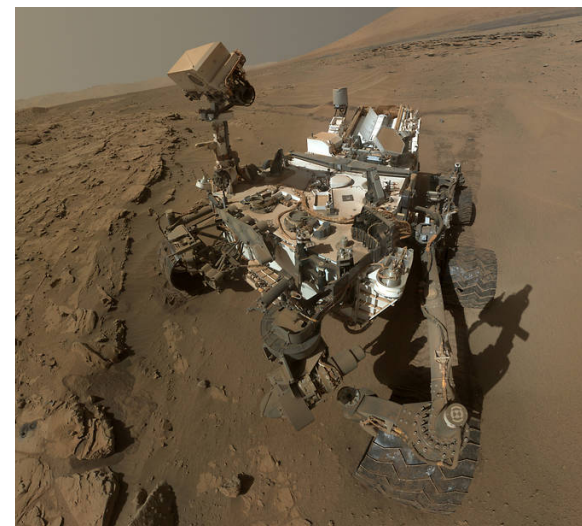
**Voyager 1 – Launched 1977
3 MHWs left the Solar System**



**Cassini (launched 1997) was powered by
LANL Heat Sources/Mound built RTGs**



**MSL (launched 2011) was powered
by LANL Heat Sources/INL built RTGs**



The Future

- **Current Mission**

- MARS 2020
- Constant Rate Production

- **Possible Future Missions**

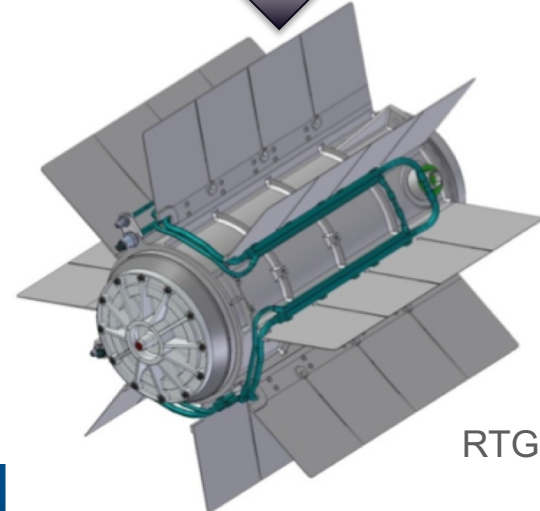
- Moon Dynamic Demo (2024)
- New Frontiers 4- Dragon Fly (2025)
- Discovery-14 (2026)
- New Frontiers 5 Flagship (2030)



$^{238}\text{PuO}_2$ Pellet



Clad



RTG

